Claims

What is claimed is:

1. A system for creating a rich-timbre environment for a multi-channel musical instrument having a plurality of vibrating elements, said system comprising:

a first group signal processor for receiving a group signal comprising a plurality of audio electrical signals generated in response to vibrations of an associated plurality of vibrating elements of said plurality of vibrating elements, wherein said first group signal processor collapses a dynamic range of said group signal to produce a first collapsed dynamic range group signal;

a pitch-transposing signal processor for receiving a first individual signal comprising an audio electrical signal generated in response to vibrations of an associated vibrating element of said plurality of vibrating elements, wherein said pitch-transposing signal processor shifts the pitch of said first individual signal to produce a first pitch-transposed individual signal;

an emphasis signal processor for receiving a second individual signal comprising an audio electrical signal generated in response to vibrations of an associated vibrating element of said plurality of vibrating elements, wherein said emphasis signal processor emphasizes said second individual signal to produce a first emphasized individual signal that comprises a distinct timbre relative to said first collapsed dynamic range group signal and said first pitch-transposed individual signal; and

an audio mixer for mixing signals produced by said first group signal processor, said pitch-transposing signal processor, and said emphasis signal processor, and/or mixing processed versions of said first collapsed dynamic range group signal, said first pitch-transposed individual signal, and said first emphasized individual signal, to produce at least one outgoing mixed audio signal.

2. The system according to claim 1, wherein said at least one outgoing mixed audio signal comprises a stereo audio signal.

3. The system according to claim 1, wherein said first collapsed dynamic range group signal is processed by a spatializing signal processor before said first collapsed dynamic range group signal is mixed by said audio mixer.

4. The system according to claim 3, wherein said processing performed by said spatializing signal processor produces a chorus effect.

5. The system according to claim 3, wherein said processing performed by said spatializing signal processor produces a flanger effect.

6. The system according to claim 3, wherein said processing performed by said spatializing signal processor produces a reverb effect.

7. The system according to claim 1, wherein said first emphasized individual signal is processed by a spatializing signal processor before said first emphasized individual signal is mixed by said audio mixer.

8. The system according to claim 7, wherein said processing performed by said spatializing signal processor produces a chorus effect.

9. The system according to claim 7, wherein said processing performed by said spatializing signal processor produces a flanger effect.

10. The system according to claim 7, wherein said processing performed by said spatializing signal processor produces a reverb effect.

11. The system according to claim 1, wherein said first pitch-transposed individual signal is processed by a spatializing signal processor before said first pitch-transposed individual signal is mixed by said audio mixer.

12. The system according to claim 11, wherein said processing performed by said spatializing signal processor produces a chorus effect.

13. The system according to claim 11, wherein said processing performed by said spatializing signal processor produces a flanger effect.

14. The system according to claim 11, wherein said processing performed by said spatializing signal processor produces a reverb effect.

15. The system according to claim 1, wherein said first group signal processor utilizes an automatic variable gain audio signal compressor to produce said first collapsed dynamic range group signal.

16. The system according to claim 1, wherein said first group signal processor utilizes nonlinear mapping to produce said first collapsed dynamic range group signal.

17. The system according to claim 1, wherein said first group signal processor utilizes a multiple-output distortion element to collapse said dynamic range of said group signal to produce said first collapsed dynamic range group signal and a second collapsed dynamic range group signal, and wherein

said audio mixer further mixes said second collapsed dynamic range group signal and/or processed versions of said second collapsed dynamic range group signal to produce said at least one outgoing mixed audio signal.

18. The system according to claim 17, wherein said multiple-output distortion element utilizes a plurality of nonlinear mappings to produce said first collapsed dynamic range group signal and said second collapsed dynamic range group signal.

19. The system according to claim 17, wherein said multiple-output distortion element utilizes a spatializer signal processor to generate a first and second spatialized group signal, wherein

said first spatialized group signal is provided to a first nonlinear distortion element to produce said first collapsed dynamic range group signal, and wherein

said second spatialized group signal is provided to a second nonlinear distortion element to produce said second collapsed dynamic range group signal.

20. The system according to claim 17, wherein said first and second collapsed dynamic range group signals are processed by a multiple-channel spatializing signal processor before said first and second collapsed dynamic range group signals are mixed by said audio mixer.

21. The system according to claim 20, wherein said processing performed by said multiple-channel spatializing signal processor produces a cross-flanging effect.

22. The system according to claim 20, wherein said processing performed by said multiple-channel spatializing signal processor produces a cross-channel modulated delay.

23. The system according to claim 20, wherein said processing performed by said multiple-channel spatializing signal processor produces a cross-product octave chain.

24. The system according to claim 20, wherein said processing performed by said multiple-channel spatializing signal processor produces a staggered-phase panning location modulation.

25. The system according to claim 1, wherein said first group signal processor utilizes a hysteresis waveshaper to produce said first collapsed dynamic range group signal.

26. The system according to claim 1, wherein said first group signal processor utilizes a multiple-channel hysteresis waveshaper to produce said first collapsed dynamic range group signal.

27. The system according to claim 26, wherein said multiple-channel hysteresis waveshaper comprises at least two single-channel hysteresis waveshapers to collapse said dynamic range of said group signal to produce said first collapsed dynamic range group signal and a second collapsed dynamic range group signal, and wherein

each waveshaper of said at least two single-channel hysteresis waveshapers has a controllable waveshaping parameter, wherein said controllable waveshaping parameters of said at least two single-channel hysteresis waveshapers are qualitatively modulated by effectively identical modulation signals, and wherein

said audio mixer further mixes said second collapsed dynamic range group signal and/or processed versions of said second collapsed dynamic range group signal to produce said at least one outgoing mixed audio signal.

28. The system according to claim 26, wherein said multiple-channel hysteresis waveshaper comprises at least two single-channel hysteresis waveshapers to collapse said dynamic range of said group signal to produce said first collapsed dynamic range group signal and a second collapsed dynamic range group signal, and wherein

each waveshaper of said at least two single-channel hysteresis waveshapers has a controllable waveshaping parameter, wherein said controllable waveshaping parameters of said at least two single-channel hysteresis waveshapers are qualitatively modulated such that said waveshaping parameter of one of said at least two single-channel hysteresis waveshapers increases as said waveshaping parameter of a different one of said at least two single-channel hysteresis waveshapers decreases, and wherein

said audio mixer further mixes said second collapsed dynamic range group signal and/or processed versions of said second collapsed dynamic range group signal to produce said at least one outgoing mixed audio signal.

29. The system according to claim 26, wherein said multiple-channel hysteresis waveshaper comprises at least two single-channel hysteresis waveshapers to collapse said dynamic range of said group signal to produce said first collapsed dynamic range group signal and a second collapsed dynamic range group signal, and wherein

each waveshaper of said at least two single-channel hysteresis waveshapers has a controllable waveshaping parameter, wherein said at least two single-channel hysteresis waveshapers are qualitatively modulated by phase-staggered modulation signals, and wherein

said audio mixer further mixes said second collapsed dynamic range group signal and/or processed versions of said second collapsed dynamic range group signal to produce said at least one outgoing mixed audio signal.

30. The system according to claim 1, said system further comprising:

a second group signal processor for receiving a second group signal comprising a plurality of audio electrical signals generated in response to vibrations of an associated plurality of vibrating elements of said plurality of vibrating elements, wherein said second group signal processor collapses a dynamic range of said second group signal to produce a second collapsed dynamic range group signal; and wherein

said audio mixer further mixes signals produced by said second group signal processor and/or further mixes processed versions of said second collapsed dynamic range group signal to produce said at least one outgoing mixed audio signal.

31. The system according to claim 30, wherein said first group signal processor utilizes an automatic variable gain audio signal compressor to generate said first collapsed dynamic range group signal and said second group signal processor utilizes a nonlinear distortion element to generate said second collapsed dynamic range group signal.

32. The system according to claim 1, wherein said audio mixer further mixes said group signal to produce said at least one outgoing mixed audio signal.

33. The system according to claim 1, wherein said group signal is processed by a spatializing signal processor to produce a multiple-channel spatialized group signal, and wherein said audio mixer further mixes said multiple-channel spatialized group signal to produce said at least one outgoing mixed audio signal.

34. The system according to claim 1, said system further comprising:

a second emphasis signal processor for receiving a third individual signal comprising an audio electrical signal generated in response to vibrations of an associated vibrating element of said plurality of vibrating elements, wherein said second emphasis signal processor emphasizes said third individual signal to produce a second emphasized individual signal that comprises a distinct timbre relative to said first collapsed dynamic range group signal and said first pitch-transposed individual signal; and

a spatializing signal processor for processing said second emphasized individual signal to produce a multiple-channel spatialized emphasis signal, and wherein

said audio mixer also mixes said multiple-channel spatialized emphasis signal to produce said at least one outgoing mixed audio signal.

35. The system according to claim 1, said system further comprising:

a second emphasis signal processor for receiving a third individual signal comprising an audio electrical signal generated in response to vibrations of an associated vibrating element of said plurality of vibrating elements, wherein said second emphasis signal processor emphasizes said third individual signal to produce a second emphasized individual signal that comprises a distinct timbre relative to said first emphasized individual signal and/or a subsequently processed version of said first emphasized individual signal, and wherein

said audio mixer also mixes said second emphasized individual signal and/or a subsequently processed version of said second emphasized individual signal in producing said at least one outgoing mixed audio signal.

36. The system according to claim 1, wherein said emphasis signal processor utilizes a multiple-output distortion element to emphasize said second individual signal to produce said first emphasized individual signal and a second emphasized individual signal, and wherein

said audio mixer further mixes said second emphasized individual signal and/or processed versions of said second emphasized individual signal to produce said at least one outgoing mixed audio signal.

37. The system according to claim 36, wherein said multiple-output distortion element utilizes a plurality of nonlinear mappings to produce said first emphasized individual signal and said second emphasized individual signal.

38. The system according to claim 36, wherein said multiple-output distortion element utilizes a spatializer signal processor to generate a first and second spatialized signal, wherein

said first spatialized signal is provided to a first nonlinear distortion element to produce said first emphasized individual signal, and wherein

said second spatialized signal is provided to a second nonlinear distortion element to produce said second emphasized individual signal.

39. The system according to claim 36, wherein said first emphasized individual signal and said second emphasized individual signal are processed by a multiple-channel spatializing signal processor before said first emphasized individual signal and said second emphasized individual signal are mixed by said audio mixer.

40. The system according to claim 39, wherein said processing performed by said multiple-channel spatializing signal processor produces a cross-flanging effect.

41. The system according to claim 39, wherein said processing performed by said multiple-channel spatializing signal processor produces a cross-channel modulated delay.

42. The system according to claim 39, wherein said processing performed by said multiple-channel spatializing signal processor produces a cross-product octave chain.

43. The system according to claim 39, wherein said processing performed by said multiple-channel spatializing signal processor produces a staggered-phase panning location modulation.

44. The system according to claim 1, wherein said emphasis signal processor utilizes a hysteresis waveshaper to produce said first emphasized individual signal.

45. The system according to claim 1, wherein said emphasis signal processor utilizes a multiple-channel hysteresis waveshaper to produce said first emphasized individual signal.

46. The system according to claim 45, wherein said multiple-channel hysteresis waveshaper comprises at least two single-channel hysteresis waveshapers to emphasize said second individual signal to produce said first emphasized individual signal and a second emphasized individual signal, and wherein

each waveshaper of said at least two single-channel hysteresis waveshapers has a controllable waveshaping parameter, wherein said controllable waveshaping parameters of said at least two single-channel hysteresis waveshapers are qualitatively modulated by effectively identical modulation signals, and wherein

said audio mixer further mixes said second emphasized individual signal and/or processed versions of said second emphasized individual signal to produce said at least one outgoing mixed audio signal.

47. The system according to claim 45, wherein said multiple-channel hysteresis waveshaper comprises at least two single-channel hysteresis waveshapers to emphasize said second individual signal to produce said first emphasized individual signal and a second emphasized individual signal, and wherein

each waveshaper of said at least two single-channel hysteresis waveshapers has a controllable waveshaping parameter, wherein said controllable waveshaping parameters of said at least two single-channel hysteresis waveshapers are qualitatively modulated such that said waveshaping parameter of one of said at least two single-channel hysteresis waveshapers increases as said waveshaping parameter of a different one of said at least two single-channel hysteresis waveshapers decreases, and wherein

said audio mixer further mixes said second emphasized individual signal and/or processed versions of said second emphasized individual signal to produce said at least one outgoing mixed audio signal.

48. The system according to claim 45, wherein said multiple-channel hysteresis waveshaper comprises at least two single-channel hysteresis waveshapers to emphasize said second individual signal to produce said first emphasized individual signal and a second emphasized individual signal, and wherein

each waveshaper of said at least two single-channel hysteresis waveshapers has a controllable waveshaping parameter, wherein said at least two single-channel hysteresis waveshapers are qualitatively modulated by phase-staggered modulation signals, and wherein

said audio mixer further mixes said second emphasized individual signal and/or processed versions of said second emphasized individual signal to produce said at least one outgoing mixed audio signal.

49. The system according to claim 1, wherein said first individual signal comprises varying amplitude and a known range of pitch variation, and said pitch-transposing signal processor comprises a sub-system for producing a stabilized sub-octave audio signal, said sub-system comprising:

a low-pass filter producing a filtered signal by passing a fundamental frequency of said first individual signal over a specified pitch range within said range of pitch variation, and effectively blocking frequencies above a frequency determined by said range of pitch variation;

a frequency divider element producing a square wave signal with a frequency half that of said filtered signal;

an amplitude follower producing an amplitude control signal responsive to an amplitude of said filtered signal; and

an amplitude modulator for controlling amplitude of said square wave responsive to said amplitude control signal and producing a modulated square-wave output signal.

50. The system according to claim 49, wherein said modulated square-wave output signal is mixed with said first individual audio signal to produce said first pitch-transposed individual signal.

51. The system according to claim 49, wherein said square-wave output signal is provided to a pitch shifter which applies pitch modification to said square-wave output signal, wherein said pitch modification results in shifting the pitch of said square-wave output signal by an interval of less than one octave.

52. The system according to claim 49, wherein said modulated square-wave output signal is provided to a pitch shifter which applies pitch modification to said modulated square-wave output signal, wherein said pitch modification results in shifting the pitch of said modulated square-wave output signal by an interval of less than one octave.

53. The system according to claim 1, said system further comprising:

a second pitch-transposing signal processor for receiving a third individual signal comprising an audio electrical signal generated in response to vibrations of an associated vibrating element of said plurality of vibrating elements, wherein said second pitch-transposing signal processor shifts the pitch of said third individual signal to produce a second pitch-transposed individual signal;

a spatializing signal processor for processing said second pitch-transposed individual signal to produce a multiple-channel spatialized pitch-transposed signal; and wherein

said audio mixer also mixes said multiple-channel spatialized pitch-transposed signal to produce said at least one outgoing mixed audio signal.

54. The system according to claim 39, wherein said multiple-channel spatializing signal processor utilizes a cross-product octave chain to processes said first emphasized individual signal and said second emphasized individual signal.

55. A method for creating a rich-timbre environment for a multi-channel musical instrument having a plurality of vibrating elements, said method comprising:

receiving a group signal comprising a plurality of audio electrical signals generated in response to vibrations of an associated plurality of vibrating elements of said plurality of vibrating elements;

collapsing a dynamic range of said group signal to produce a first collapsed dynamic range group signal;

receiving a first individual signal comprising an audio electrical signal generated in response to vibrations of an associated vibrating element of said plurality of vibrating elements;

shifting the pitch of said first individual signal to produce a first pitch-transposed individual signal;

receiving a second individual signal comprising an audio electrical signal generated in response to vibrations of an associated vibrating element of said plurality of vibrating elements;

emphasizing said second individual signal to produce a first emphasized individual signal that comprises a distinct timbre relative to said first collapsed dynamic range group signal and said first pitch-transposed individual signal; and

mixing said first collapsed dynamic range group signal, said first pitch-transposed individual signal, and said first emphasized individual signal and/or mixing processed versions of said first collapsed dynamic range group signal, said first pitch-transposed individual signal, and said first emphasized individual signal, to produce at least one outgoing mixed audio signal.

56. The method according to claim 55, wherein said at least one outgoing mixed audio signal comprises a stereo audio signal.

57. The method according to claim 55, wherein said first collapsed dynamic range group signal is processed by a spatializing signal processor before said first collapsed dynamic range group signal is mixed during said mixing.

58. The method according to claim 57, wherein said processing performed by said spatializing signal processor produces a chorus effect.

59. The method according to claim 57, wherein said processing performed by said spatializing signal processor produces a flanger effect.

60. The method according to claim 57, wherein said processing performed by said spatializing signal processor produces a reverb effect.

61. The method according to claim 55, wherein said first emphasized individual signal is processed by a spatializing signal processor before said first emphasized individual signal is mixed during said mixing.

62. The method according to claim 61, wherein said processing performed by said spatializing signal processor produces a chorus effect.

63. The method according to claim 61, wherein said processing performed by said spatializing signal processor produces a flanger effect.

64. The method according to claim 61, wherein said processing performed by said spatializing signal processor produces a reverb effect.

65. The method according to claim 55, wherein said first pitch-transposed individual signal is processed by a spatializing signal processor before said first pitch-transposed individual signal is mixed during said mixing.

66. The method according to claim 65, wherein said processing performed by said spatializing signal processor produces a chorus effect.

67. The method according to claim 65, wherein said processing performed by said spatializing signal processor produces a flanger effect.

68. The method according to claim 65, wherein said processing performed by said spatializing signal processor produces a reverb effect.

69. The method according to claim 55, wherein said collapsing a dynamic range of said group signal is accomplished using an automatic variable gain audio signal compressor.

70. The method according to claim 55, wherein said collapsing a dynamic range of said group signal is accomplished using nonlinear mapping.

71. The method according to claim 55, wherein said collapsing a dynamic range of said group signal is accomplished using a multiple-output distortion element to produce said first collapsed dynamic range group signal and a second collapsed dynamic range group signal, and wherein

said mixing further comprises mixing said second collapsed dynamic range group signal and/or processed versions of said second collapsed dynamic range group signal to produce said at least one outgoing mixed audio signal.

72. The method according to claim 71, wherein said multiple-output distortion element utilizes a plurality of nonlinear mappings to produce said first collapsed dynamic range group signal and said second collapsed dynamic range group signal.

73. The method according to claim 71, wherein said multiple-output distortion element utilizes a spatializer signal processor to generate a first and second spatialized group signal, wherein

said first spatialized group signal is provided to a first nonlinear distortion element to produce said first collapsed dynamic range group signal, and wherein

said second spatialized group signal is provided to a second nonlinear distortion element to produce said second collapsed dynamic range group signal.

74. The method according to claim 71, wherein said first and second collapsed dynamic range group signals are processed by a multiple-channel spatializing signal processor before said first and second collapsed dynamic range group signals are mixed during said mixing.

75. The method according to claim 74, wherein said processing performed by said multiple-channel spatializing signal processor produces a cross-flanging effect.

76. The method according to claim 74, wherein said processing performed by said multiple-channel spatializing signal processor produces a cross-channel modulated delay.

77. The method according to claim 74, wherein said processing performed by said multiple-channel spatializing signal processor produces a cross-product octave chain.

78. The method according to claim 74, wherein said processing performed by said multiple-channel spatializing signal processor produces a staggered-phase panning location modulation.

79. The method according to claim 55, wherein said collapsing a dynamic range of said group signal is accomplished using a hysteresis waveshaper.

80. The method according to claim 55, wherein said collapsing a dynamic range of said group signal is accomplished using a multiple-channel hysteresis waveshaper.

81. The method according to claim 80, wherein said multiple-channel hysteresis waveshaper comprises at least two single-channel hysteresis waveshapers to collapse said dynamic range of said group signal to produce said first collapsed dynamic range group signal and a second collapsed dynamic range group signal, and wherein

each waveshaper of said at least two single-channel hysteresis waveshapers has a controllable waveshaping parameter, wherein said controllable waveshaping parameters of said at least two single-channel hysteresis waveshapers are qualitatively modulated by effectively identical modulation signals, and wherein

said mixing further comprises mixing said second collapsed dynamic range group signal and/or processed versions of said second collapsed dynamic range group signal to produce said at least one outgoing mixed audio signal.

82. The method according to claim 80, wherein said multiple-channel hysteresis waveshaper comprises at least two single-channel hysteresis waveshapers to collapse said dynamic range of said group signal to produce said first collapsed dynamic range group signal and a second collapsed dynamic range group signal, and wherein

each waveshaper of said at least two single-channel hysteresis waveshapers has a controllable waveshaping parameter, wherein said controllable waveshaping parameters of said at least two single-channel hysteresis waveshapers are qualitatively modulated such that said waveshaping parameter of one of said at least two single-channel hysteresis waveshapers increases as said waveshaping parameter of a different one of said at least two single-channel hysteresis waveshapers decreases, and wherein

said mixing further comprises mixing said second collapsed dynamic range group signal and/or processed versions of said second collapsed dynamic range group signal to produce said at least one outgoing mixed audio signal.

83. The method according to claim 80, wherein said multiple-channel hysteresis waveshaper comprises at least two single-channel hysteresis waveshapers to collapse said dynamic range of said group signal to produce said first collapsed dynamic range group signal and a second collapsed dynamic range group signal, and wherein

each waveshaper of said at least two single-channel hysteresis waveshapers has a controllable waveshaping parameter, wherein said at least two single-channel hysteresis waveshapers are qualitatively modulated by phase-staggered modulation signals, and wherein

said mixing further comprises mixing said second collapsed dynamic range group signal and/or processed versions of said second collapsed dynamic range group signal to produce said at least one outgoing mixed audio signal.

84. The method according to claim 55, said method further comprising:

receiving a second group signal comprising a plurality of audio electrical signals generated in response to vibrations of an associated plurality of vibrating elements of said plurality of vibrating elements;

collapsing a dynamic range of said second group signal to produce a second collapsed dynamic range group signal; and wherein

said mixing further comprises mixing said second collapsed dynamic range group signal and/or further mixing processed versions of said second collapsed dynamic range group signal to produce said at least one outgoing mixed audio signal.

85. The method according to claim 84, wherein said collapsing a dynamic range of said first group signal is accomplished using an automatic variable gain audio signal compressor to generate said first collapsed dynamic range group signal and said collapsing a dynamic range of said second group signal is accomplished using a nonlinear distortion element to generate said second collapsed dynamic range group signal.

86. The method according to claim 55, wherein said mixing further comprises mixing said group signal to produce said at least one outgoing mixed audio signal.

87. The method according to claim 55, wherein said group signal is processed by a spatializing signal processor to produce a multiple-channel spatialized group signal, and wherein said mixing further comprises mixing said multiple-channel spatialized group signal to produce said at least one outgoing mixed audio signal.

88. The method according to claim 55, said method further comprising:

receiving a third individual signal comprising an audio electrical signal generated in response to vibrations of an associated vibrating element of said plurality of vibrating elements;

emphasizing said third individual signal to produce a second emphasized individual signal that comprises a distinct timbre relative to said first collapsed dynamic range group signal and said first pitch-transposed individual signal;

processing said second emphasized individual signal to produce a multiple-channel spatialized emphasis signal; and wherein

said mixing further comprises mixing said multiple-channel spatialized emphasis signal to produce said at least one outgoing mixed audio signal.

89. The method according to claim 55, said method further comprising:

receiving a third individual signal comprising an audio electrical signal generated in response to vibrations of an associated vibrating element of said plurality of vibrating elements;

emphasizing said third individual signal to produce a second emphasized individual signal that comprises a distinct timbre relative to said first emphasized individual signal and/or a subsequently processed version of said first emphasized individual signal; and wherein

said mixing further comprises mixing said second emphasized individual signal and/or a subsequently processed version of said second emphasized individual signal to producing said at least one outgoing mixed audio signal.

90. The method according to claim 55, wherein said emphasizing said second individual signal is accomplished using a multiple-output distortion element to produce said first emphasized individual signal and a second emphasized individual signal; and wherein

said mixing further comprises mixing said second emphasized individual signal and/or processed versions of said second emphasized individual signal to produce said at least one outgoing mixed audio signal.

91. The method according to claim 90, wherein said multiple-output distortion element utilizes a plurality of nonlinear mappings to produce said first emphasized individual signal and said second emphasized individual signal.

92. The method according to claim 90, wherein said multiple-output distortion element utilizes a spatializer signal processor to generate a first and second spatialized signal, wherein

said first spatialized signal is provided to a first nonlinear distortion element to produce said first emphasized individual signal, and wherein

said second spatialized signal is provided to a second nonlinear distortion element to produce said second emphasized individual signal.

93. The method according to claim 90, wherein said first emphasized individual signal and said second emphasized individual signal are processed by a multiple-channel spatializing signal processor before said first emphasized individual signal and said second emphasized individual signal are mixed during said mixing.

94. The method according to claim 93, wherein said processing performed by said multiple-channel spatializing signal processor produces a cross-flanging effect.

95. The method according to claim 93, wherein said processing performed by said multiple-channel spatializing signal processor produces a cross-channel modulated delay.

96. The method according to claim 93, wherein said processing performed by said multiple-channel spatializing signal processor produces a cross-product octave chain.

97. The method according to claim 93, wherein said processing performed by said multiple-channel spatializing signal processor produces a staggered-phase panning location modulation.

98. The method according to claim 55, wherein said emphasizing said second individual signal is accomplished using a hysteresis waveshaper to produce said first emphasized individual signal.

99. The method according to claim 55, wherein said emphasis signal processor utilizes a multiple-channel hysteresis waveshaper to produce said first emphasized individual signal.

100. The method according to claim 99, wherein said multiple-channel hysteresis waveshaper comprises at least two single-channel hysteresis waveshapers to emphasize said second individual signal to produce said first emphasized individual signal and a second emphasized individual signal, wherein

each waveshaper of said at least two single-channel hysteresis waveshapers has a controllable waveshaping parameter, wherein said controllable waveshaping parameters of said at least two single-channel hysteresis waveshapers are qualitatively modulated by effectively identical modulation signals, and wherein

said mixing further comprises mixing said second emphasized individual signal and/or processed versions of said second emphasized individual signal to produce said at least one outgoing mixed audio signal.

101. The method according to claim 99, wherein said multiple-channel hysteresis waveshaper comprises at least two single-channel hysteresis waveshapers to emphasize said second individual signal to produce said first emphasized individual signal and a second emphasized individual signal, wherein

each waveshaper of said at least two single-channel hysteresis waveshapers has a controllable waveshaping parameter, wherein said controllable waveshaping parameters of said at least two single-channel hysteresis waveshapers are qualitatively modulated such that said waveshaping parameter of one of said at least two single-channel hysteresis waveshapers increases as said waveshaping parameter of a different one of said at least two single-channel hysteresis waveshapers decreases, and wherein

said mixing further comprises mixing said second emphasized individual signal and/or processed versions of said second emphasized individual signal to produce said at least one outgoing mixed audio signal.

102. The method according to claim 99, wherein said multiple-channel hysteresis waveshaper comprises at least two single-channel hysteresis waveshapers to emphasize said second individual signal to produce said first emphasized individual signal and a second emphasized individual signal, wherein

each waveshaper of said at least two single-channel hysteresis waveshapers has a controllable waveshaping parameter, wherein said at least two single-channel hysteresis waveshapers are qualitatively modulated by phase-staggered modulation signals, and wherein

said mixing further comprises mixing said second emphasized individual signal and/or processed versions of said second emphasized individual signal to produce said at least one outgoing mixed audio signal.

103. The method according to claim 55, wherein said first individual signal comprises varying amplitude and a known range of pitch variation, and said pitch-transposing signal processor comprises a sub-method for producing a stabilized sub-octave audio signal, said sub-method comprising:

producing a filtered signal by passing a fundamental frequency of said first individual signal over a specified pitch range within said range of pitch variation, and effectively blocking frequencies above a frequency determined by said range of pitch variation;

producing a square wave signal with a frequency half that of said filtered signal;

producing an amplitude control signal responsive to an amplitude of said filtered signal; and

controlling amplitude of said square wave responsive to said amplitude control signal and producing a modulated square-wave output signal.

104. The method according to claim 103, wherein said modulated square-wave output signal is mixed with said first individual audio signal to produce said first pitch-transposed individual signal.

105. The method according to claim 103, said method further comprising:

shifting the pitch of said square-wave output signal by an interval of less than one octave.

106. The method according to claim 103, said method further comprising:

shifting the pitch of said modulated square-wave output signal by an interval of less than one octave.

107. The method according to claim 55, said method further comprising:

receiving a third individual signal comprising an audio electrical signal generated in response to vibrations of an associated vibrating element of said plurality of vibrating elements;

shifting the pitch of said third individual signal to produce a second pitch-transposed individual signal;

processing said second pitch-transposed individual signal to produce a multiple-channel spatialized pitch-transposed signal; and wherein

said mixing further comprises mixing said multiple-channel spatialized pitch-transposed signal to produce said at least one outgoing mixed audio signal.

108. The method according to claim 93, wherein a cross-product octave chain is used to processes said first emphasized individual signal and said second emphasized individual signal.